LISTING OF CLAIMS

Below is a listing of claims that are currently under consideration:

Claim 1 (previously presented): A method for treating an abnormal neurological condition comprising the steps of:

determining a treatment regime for applying at least one electrical burst to brain tissue before detecting an electrical activity in the brain tissue, the at least one burst comprising a multiplicity of pulses, said pulses having pulse parameters;

selecting at least one pulse parameter to vary during the burst, prior to application of the burst;

applying to the brain tissue the at least one electrical burst; and

varying the at least one previously selected pulse parameters during the at least one electrical burst.

Claim 2 (previously presented): The method of claim 1 wherein the step of varying the at least one previously selected pulse parameters comprises varying at least two said previously selected pulse parameters during the burst.

Claim 3 (previously presented): The method of claim 1 further comprising the step of applying the said at least one electrical burst in response to a detectable electrical activity of the brain.

Claim 4 (previously presented): The method of claim 3 wherein said detectable electrical activity is an epileptiform electrical activity.

Claim 5 (previously presented): The method of claim 3 wherein said detectable electrical activity predicts impending epileptiform electrical activity.

Claim 6 (previously presented): The method of claim 1 wherein, said previously selected pulse parameters are selected from the group consisting of selected electrode, pulse width, pulse amplitude, pulse polarity, and pulse-to-pulse interval.

Claim 7 (previously presented): The method of claim 1 wherein said previously selected at least one pulse parameter is pulse-to-pulse interval.

Claim 8 (original): The method of claim 7 wherein said pulse-to-pulse interval is between about 3 and 300 microseconds.

Claim 9 (previously presented): The method of claim 7 wherein the step of selecting at least one pulse parameter comprises selecting a randomly varying pulse-to-pulse interval for at least a portion of the burst.

Claim 10 (previously presented): The method of claim 7 wherein the step of selecting at least one pulse parameter comprises selecting a pseudo-randomly varying pulse-to-pulse interval for at least a portion of the burst.

Claim 11 (previously presented): The method of claim 7 wherein the step of selecting at least one pulse parameter comprises selecting a fractally varying pulse-to-pulse interval for at least a portion of the burst.

Claim 12 (previously presented): The method of claim 7 wherein the step of selecting at least one pulse parameter comprises selecting an incrementally increasing pulse-to-pulse interval for at least a portion of the burst.

Claim 13 (previously presented): The method of claim 7 wherein the step of selecting at least one pulse parameter comprises selecting an incrementally decreasing pulse-to-pulse interval for at least a portion of the burst.

Claim 14 (previously presented): The method of claim 7 wherein the step of selecting the pulse-to-pulse interval as the at least one previously selected pulse parameter includes functionally selecting the pulse parameter to avoid initiation of epileptiform activity.

Claim 15 (withdrawn): The method of claim 7 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical burst.

Claim 16 (withdrawn): The method of claim 15 wherein said hyper-polarizing pulse is 40 to 500 microseconds in length.

Claim 17 (withdrawn): The method of claim 15 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

Claim 18 (previously presented): The method of claim 3 wherein said detectable electrical activity in the brain is epileptiform activity and said method further includes the step of detecting said electrical activity in the brain prior to determining the treatment regime.

Claim 19 (previously presented): The method of claim 18 wherein said at least one pulse parameter is related to said detectable electrical activity in the brain.

Claim 20 (previously presented): The method of claim 18 further including the step of determining a pulse-to-pulse interval of said electrical activity in the brain prior to determining the treatment regime.

Claim 21 (original): The method of claim 20 wherein said at least one pulse parameter is related to said detected epileptiform pulse-to-pulse interval in the brain.

Claim 22 (previously presented): The method of claim 20 wherein the at least one pulse parameter is pulse-to-pulse interval and further comprising the step of varying said pulse-to-pulse interval in length to between about 10% and about 400% of said epileptiform pulse-to-pulse interval.

Claim 23 (withdrawn): The method of claim 1 wherein said at least one pulse parameter is pulse amplitude.

Claim 24 (withdrawn): The method of claim 23 further comprising the step of randomly varying said pulse amplitude for at least a portion of the burst.

Claim 25 (withdrawn): The method of claim 23 further comprising the step of pseudo-randomly varying said pulse amplitude for at least a portion of the burst.

Claim 26 (withdrawn): The method of claim 23 further comprising the step of fractally varying said pulse amplitude for at least a portion of the burst.

Claim 27 (withdrawn): The method of claim 23 further comprising the step of incrementally increasing said pulse amplitude for at least a portion of the burst.

Claim 28 (withdrawn): The method of claim 23 further comprising the step of incrementally decreasing said pulse amplitude for at least a portion of the burst.

Claim 29 (withdrawn): The method of claim 23 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical burst.

Claim 30 (withdrawn): The method of claim 29 wherein said hyper-polarizing pulse is 40 to 500 microseconds in length.

Claim 31 (withdrawn): The method of claim 29 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

Claim 32 (withdrawn): The method of claim 1 wherein said at least one pulse parameter is pulse width.

Claim 33 (withdrawn): The method of claim 32 further comprising the step of randomly varying said pulse width for at least a portion of the burst.

Claim 34 (withdrawn): The method of claim 32 further comprising the step of pseudo-randomly varying said pulse width for at least a portion of the burst.

Claim 35 (withdrawn): The method of claim 32 further comprising the step of fractally varying said pulse width for at least a portion of the burst.

Claim 36 (withdrawn): The method of claim 32 further comprising the step of incrementally increasing said pulse width for at least a portion of the burst.

Claim 37 (withdrawn): The method of claim 32 further comprising the step of incrementally decreasing said pulse width for at least a portion of the burst.

Claim 38 (withdrawn): The method of claim 32 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating said at least one electrical burst.

Claim 39 (withdrawn): The method of claim 38 wherein said hyper-polarizing pulse is 40 to 5000 microseconds in length.

Claim 40 (withdrawn): The method of claim 38 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

Claim 41 (previously presented): The method of claim 3 wherein said detectable electrical activity in the brain is epileptiform activity and said method further includes the steps of:

detecting said electrical activity in the brain prior to initiating said at least one electrical burst;

determining both an interval of said electrical activity in the brain prior to initiating said at least one electrical burst and a characteristic of the electrical activity; and

delaying the initiation of said at least one electrical burst after the onset of the characteristic of the electrical activity for a period of time between 5% and about 100% of said interval of said electrical activity.

Claim 42 (previously presented): The method of claim 3 wherein said detectable electrical activity is an epileptiform electrical activity, said method further comprising the steps of:

detecting said electrical activity in the brain after the application of said at least one electrical burst; and

analyzing said electrical activity for epileptiform activity to produce a re-analyzed electrical activity.

Claim 43 (previously presented): The method of claim 42 wherein said re-analyzed electrical activity comprises epileptiform electrical activity, said method comprising the further steps of:

re-applying to said brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters; and

varying at least one of the pulse parameters during the re-applied at least one electrical burst.

Claim 44 (previously presented): The method of claim 43 wherein the at least one pulse parameters varied in said re-applied at least one electrical burst are different than the pulse parameters varied in an earlier at least one electrical burst.

Claim 45 (original): The method of claim 44 wherein said steps are repeated up to ten times.

Claim 46 (previously presented): A method for treating an abnormal neurological condition comprising the steps of:

determining a treatment regime for applying electrical bursts to brain tissue before detecting an electrical activity in the brain tissue, the bursts comprising a multiplicity of pulses, said pulses having pulse parameters;

selecting at least one pulse parameter to vary during the bursts, prior to application of the bursts;

applying to the brain tissue, electrical bursts to different electrodes spatially separated in a brain, and said application of electrical bursts being in response to a detectable electrical activity; and

varying at least one of the pulse parameters independently during the bursts.

Claim 47 (previously presented): The method of claim 46 further comprising delivering said multiplicity of pulses simultaneously to said electrodes.

Claim 48 (previously presented): The method of claim 46 further comprising delivering said multiplicity of pulses to said electrodes, said electrodes being configured to treat a multi-focal epilepsy.

Claim 49 (previously presented): The method of claim 46 wherein said electrical activity is an epileptiform electrical activity and wherein said electrodes are located near an epileptigenic focus, said method further comprising applying comparatively lower amplitude pulses to electrodes spatially closer to the epileptigenic focus.

Claim 50 (previously presented): An implantable neurostimulator assembly for treating a disorder in a human brain, comprising in combination:

a.) at least a first electrical neurostimulator electrode, and

b.) at least a first electrical signal source connectable to said at least first electrical neurostimulator electrode, said first electrical signal source configured to initiate at least one stimulation burst to said at least a first electrical neurostimulation electrode before detecting an electrical activity, said at least one burst comprising pulses having pulse parameters,

and wherein the first electrical signal source is configured to select at least one pulse parameter to be varied prior to initiation of a pulse and to vary the selected at least one pulse parameter prior to application of the burst.

Claim 51 (previously presented): The implantable neurostimulator of claim 50 further comprising at least a first brain electrical activity sensor for sensing electrical activity in a brain.

Claim 52 (original): The implantable neurostimulator of claim 50 wherein said first electrical signal source is configured to vary pulse parameters selected from the group consisting of electrode choice, pulse width, pulse amplitude, pulse polarity, and applied pulse-to-pulse interval.

Claim 53 (original): The implantable neurostimulator of claim 50 wherein said first electrical signal source is configured to vary said pulse parameters randomly, pseudo-randomly, fractally, incrementally increasing, incrementally decreasing, or effectively to avoid initiation of epileptiform activity.

Claim 54 (withdrawn): The implantable neurostimulator of claim 50 wherein said first electrical signal source is configured to deliver a hyper-polarizing pulse to brain tissue prior to initiating the application of said at least one electrical burst.

Claim 55 (withdrawn): The implantable neurostimulator of claim 54 wherein said hyper-polarizing pulse is 40 to 5000 microseconds in length.

Claim 56 (withdrawn): The implantable neurostimulator of claim 54 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

Claim 57 (previously presented): The implantable neurostimulator of claim 51 wherein said at least a first brain electrical activity sensor is configured to detect epileptiform activity prior to initiating the application of said at least one electrical burst.

Claim 58 (previously presented): The implantable neurostimulator of claim 51 wherein said at least a first brain electrical activity sensor is configured to determine the epileptiform pulse-to-pulse interval of said electrical activity in the brain prior to initiating the application of said at least one electrical burst.

Claim 59 (original): The implantable neurostimulator of claim 58 wherein said first electrical signal source is configured to deliver an applied pulse-to-pulse interval that is varied in length between about 105% and about 400% of said epileptiform pulse-to-pulse interval.

Claim 60 (previously presented): The implantable neurostimulator of claim 58 wherein said first electrical signal source is configured to again apply at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse parameters vary during the burst, when said at least a first brain electrical activity sensor detects epileptiform electrical activity after application of said first electrical burst.

Claim 61 (original): The implantable neurostimulator of claim 58 wherein said first electrical signal source is configured to vary said one or pulse parameters in said re-applied at least one electrical burst that are different than the pulse parameters varied in said at least one electrical burst.

Claim 62 (previously presented): The implantable neurostimulator of claim 61 wherein said first brain electrical activity sensor comprises multiple brain electrical activity sensors.

Claim 63 (previously presented): The implantable neurostimulator of claim 62 wherein said multiple brain electrical activity sensors comprise sensors for measuring said at least one brain electrical activity of said brain simultaneously at different sites in a brain.

Claim 64 (previously presented): The implantable neurostimulator of claim 62 wherein said sensors are configured to measure said brain activity at a depth within a brain.

Claim 65 (previously presented): The implantable neurostimulator of claim 62 wherein said sensors are configured to measure said brain activity on a scalp.

Claim 66 (withdrawn): A method for treating an abnormal neurological condition comprising the steps of:

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses; and

synchronizing said at least one electrical burst to detectable electrical activity of the brain.

Claim 67 (withdrawn): The method of claim 66 wherein said detected electrical activity is an epileptiform electrical activity.

Claim 68 (withdrawn): The method of claim 66 wherein said detected electrical activity predicts impending epileptiform electrical activity.

Claim 69 (withdrawn): A method for treating an abnormal neurological condition comprising the steps of:

determining the interval of an electrical signal in a brain; and

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters related to said detected interval in the brain.

Claim 70 (withdrawn): The method of claim 69 wherein the determined interval comprises epileptiform pulse-to-pulse intervals.

Claim 71 (withdrawn): The method of claim 70 wherein said pulse-to-pulse interval is varied in length between about 10% and about 400% of said epileptiform pulse-to-pulse interval.

Claim 72 (withdrawn): A method for treating an abnormal neurological condition in a brain comprising the steps of :

detecting an electrical activity in a brain prior to initiating the application of at least one electrical burst;

determining the interval of said electrical activity in the brain prior to initiating the application of said at least one electrical burst; and

delaying the initiation of the application of said at least one electrical burst after the onset of the detected electrical activity for a period of time between 5% and about 100% of said interval of said electrical activity.

Claim 73 (withdrawn): The method of claim 72 wherein said electrical activity is an epileptiform electrical activity, said method further comprising the steps of again detecting said electrical activity in the brain after the application of said at least one electrical burst and analyzing said electrical activity for epileptiform activity.

Claim 74 (withdrawn): A method for treating an abnormal neurological condition comprising the steps of:

detecting electrical activity in the brain; and

applying to brain tissue a multiplicity of pulses having pulse parameters independently to different electrodes spatially separated in said brain.

Claim 75 (withdrawn): The method of claim 74 wherein said detected electrical activity is an epileptiform electrical activity.

Claim 76 (withdrawn): The method of claim 74 wherein said detected electrical activity predicts impending epileptiform electrical activity.

Claim 77 (withdrawn): A method for treating an abnormal neurological condition comprising the steps of:

detecting electrical activity in a brain; and

delivering a hyper-polarizing pulse to said brain prior to initiating the application of at least one electrical pulse.

Claim 78 (withdrawn): The method of claim 77 wherein said hyper-polarizing pulse is 40 to 5000 microseconds in length.

Claim 79 (withdrawn): The method of claim 77 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

Claim 80 (withdrawn): The method of claim 77 further comprising the step of detecting epileptiform activity in said brain prior to initiating the application of said at least one electrical burst.

Claim 81 (withdrawn): The method of claim 80 further comprising the steps of determining epileptiform activity pulse-to-pulse interval and delivering at least one pulse having a pulse-to-pulse interval in length between about 105% and about 400% of said epileptiform activity pulse-to-pulse interval.

Claim 82 (previously presented): A method for treating an abnormal neurological condition comprising the steps of:

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters;

varying at least one of the pulse parameters during the at least one electrical burst;

applying the at least one electrical burst in response to a detectable electrical activity of the brain, wherein the detectable electrical activity in the brain is epileptiform activity and wherein the step of detecting the electrical activity in the brain is performed prior to initiating the application of the at least one electrical burst;

determining a pulse-to-pulse interval of said electrical activity in the brain prior to initiating said at least one electrical burst, wherein the at least one pulse parameter is pulse-to-pulse interval and further comprising the step of varying said pulse-to-pulse interval in length to between about 10% and about 400% of said epileptiform pulse-to-pulse interval.

Claim 83 (previously presented): A method for treating an abnormal neurological condition comprising the steps of:

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, the at least one electrical burst being applied in response to an epileptiform activity of the brain;

detecting the epileptiform activity in the brain prior to initiating said at least one electrical burst;

determining both an interval of the epileptiform activity in the brain prior to initiating said at least one electrical burst and a characteristic of the epileptiform activity;

delaying the initiation of said at least one electrical burst after the onset of the characteristic of the epileptiform activity for a period of time between 5% and about 100% of said interval of said epileptiform activity; and

varying at least one of the pulse parameters during the at least one electrical burst.

Claim 84 (previously presented): A method for treating an abnormal neurological condition comprising the steps of:

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, wherein the at least one electrical burst in applied in response to a detectable electrical activity of the brain, and wherein said detectable electrical activity is an epileptiform electrical activity;

detecting said electrical activity in the brain after the application of said at least one electrical burst;

analyzing said electrical activity for epileptiform activity to produce a re-analyzed electrical activity; and

varying at least one of the pulse parameters during the at least one electrical burst.

Claim 85 (previously presented): The method of claim 84 wherein said re-analyzed electrical activity comprises epileptiform electrical activity, said method comprising the further steps of:

re-applying to said brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters; and

varying at least one of the pulse parameters during the re-applied at least one electrical burst.

Claim 86 (previously presented): The method of claim 85 wherein the at least one pulse parameters varied in said re-applied at least one electrical burst are different than the pulse parameters varied in an earlier at least one electrical burst.

Claim 87 (previously presented): The method of claim 86 wherein said steps are repeated up to ten times.

Claim 88 (previously presented): An implantable neurostimulator assembly for treating a disorder in a human brain, comprising in combination:

a.) at least a first electrical neurostimulator electrode;

b.) at least a first electrical signal source connectable to said at least first electrical neurostimulator electrode, said first electrical signal source configured to initiate a stimulation burst to said at least a first electrical neurostimulation electrode, said at least one burst comprising pulses having pulse parameters, and wherein the first electrical signal source is configured to vary the pulse parameters;

c.) at least a first brain electrical activity sensor for sensing electrical activity in a brain, wherein said at least first brain electrical activity sensor is configured to determine an epileptiform pulse-to-pulse interval of said electrical activity in the brain prior to initiating the application of said at least one electrical burst; and

wherein said first electrical signal source is configured to deliver an applied pulse-to-pulse interval that is varied in length between about 105% and about 400% of said epileptiform pulse-to-pulse interval.

Claim 89 (previously presented): An implantable neurostimulator assembly for treating a disorder in a human brain, comprising in combination:

a.) at least a first electrical neurostimulator electrode;

b.) at least a first electrical signal source connectable to said at least first electrical neurostimulator electrode, said first electrical signal source configured to initiate at least one stimulation burst to said at least first electrical neurostimulation electrode, said at least one burst

comprising pulses having pulse parameters, and wherein the first electrical signal source is configured to vary the pulse parameters;

c.) at least a first brain electrical activity sensor for sensing electrical activity in a brain, wherein said at least first brain electrical activity sensor is configured to determine an epileptiform pulse-to-pulse interval of said electrical activity in the brain prior to initiating the application of said at least one electrical burst; and

further wherein said first electrical signal source is configured to again apply at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse parameters vary during the burst, when said at least first brain electrical activity sensor detects epileptiform electrical activity after application of the said first electrical burst.

Claim 90 (previously presented): An implantable neurostimulator assembly for treating a disorder in a human brain, comprising in combination:

a.) at least a first electrical neurostimulator electrode, and

b.) at least a first electrical signal source connectable to said at least first electrical neurostimulator electrode, said first electrical signal source configured to initiate at least one stimulation burst to said at least a first electrical neurostimulation electrode, said at least one burst comprising pulses having pulse parameters, and wherein the first electrical signal source is configured to vary the pulse parameters;

c.) at least a first brain electrical activity sensor for sensing electrical activity in a brain, wherein said at least a first brain electrical activity sensor is configured to determine an epileptiform pulse-to-pulse interval of said electrical activity in the brain prior to initiating the application of at least one electrical burst when said at least first brain electrical activity sensor detects epileptiform electrical activity after application of said stimulation burst;

wherein said first electrical signal source is configured to again apply at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse parameters vary during the burst, when said at least first brain electrical activity sensor detects epileptiform electrical activity after application of the said stimulation burst; and

further wherein said first electrical signal source is configured to vary at least one pulse parameter in said at least one re-applied electrical burst which parameter is different than the pulse parameter varied in said at least one stimulation burst.

Claim 91 (previously presented): The implantable neurostimulator of claim 88 wherein said first brain electrical activity sensor comprises multiple brain electrical activity sensors.

Claim 92 (previously presented): The implantable neurostimulator of claim 89 wherein said multiple brain electrical activity sensors comprise sensors for measuring said at least one brain electrical activity of said brain simultaneously at different sites in a brain.

Claim 93 (previously presented): The implantable neurostimulator of claim 89 wherein said sensors are configured to measure said brain activity at a depth within a brain.

Claim 94 (previously presented): The implantable neurostimulator of claim 89 wherein said sensors are configured to measure said brain activity on a scalp.